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Department of Health and Environmental Sciences
STATE OF MONTANA HELENA, MONTANA 59601

John S. Anderson M.D.
DIRECTOR

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November 29, 1973

Governor Tom Judge, Helena
Denice Abelin, Basin, Montana
Charles Goodwin, Basin
P. L. Hriston, Basin
Dave Johnson, Basin
Brad Madden, Basin
Mrs. John O'Neill, Basin
Mrs. Stayton, Basin
Grant Thompson, Basin
Andrew Ulster, Basin
Basin Water Company, Basin
Marvin Katka, Basin
Norbert Stauner, Basin
Perry Coleman, Basin
Environmental Quality Council, Helena
Department of Natural Resources and Conservation, Helena
James Posewitz, Department of Fish and Game, Helena
Cleve Johnson, County Sanitarian, Courthouse, Boulder
Jefferson County Commissioners, Boulder
LBM Construction Company, Inc., 1816 LaFayette, Butte
U. S. Forest Service, Depot Road, Boulder
Bernice A. Lowe, Basin
The Independent Record, 317 Allen, Helena

Ladies and Gentlemen:

This impact statement has been prepared for your consideration, pursuant to the Montana Environmental Policy Act. If you have any comments or questions regarding the material discussed in the impact statement, they should be sent to me no later than December 29, 1973, although a 15-day extension of this period may be granted if there is sufficient reason.

If there is no serious questioning of the operation outlined in the statement, the state will move to issue a wastewater discharge permit as requested by the developers.

Sincerely,

Daniel Vichorek by vlf

Daniel Vichorek
Technical Writer
Environmental Sciences Division

DV:vlf

cc: Ben Wake
Dan Vichorek
✓State Library

SUMMARY

The Jib Mine in Basin, Montana has been reopened by the LBM Construction Company, Inc. of Butte, Montana. Access to the workings will be via an existing shaft. Considerable groundwater exists in the workings so continuous pumping will be required. Water will be discharged to the Boulder River. Except for turbidity, analysis of the water indicates no probable adverse effect on fish or associated aquatic life in the river. The pumping has, however, apparently caused some wells in Basin to go dry.

A flotation mill to process the ore is being constructed on an existing site at Basin. Capacity is 150 tons per day. There will be no discharge from the mill as water used in the milling process will be recycled. The Basin Water Company will supply make-up water.

The only serious effect of operating this mine is the resultant failure of wells in the area. Reportedly, this has occurred each time the mine was operated in the past and was the reason for building the original Basin water system in 1904. However, all homes are not connected to the system for unknown reasons.

PURPOSE AND DESCRIPTION OF THE PROPOSED ACTION

Mining history in Jefferson County, Montana dates back to July 1862, when the first placer was discovered. Activity increased, particularly after gold was discovered in Last Chance Gulch (Helena) in 1864. Peak productivity occurred between 1883 and 1893. The silver panic of 1893 forced many mines to close, and production has been sporadic ever since (Roby, Ackerman, Fulkerson and Crowley, 1960).

Recent price increases for metals, particularly precious metals, has prompted renewed interest in mining. Reopening of the Jib Mine in Basin, Montana (Jefferson County) reflects this renewed interest. It is anticipated that gold, plus other metals, will be recovered from the Jib.

The mine will be worked via an existing shaft. Considerable groundwater will be encountered in the underground workings. So, continuous pumping will be necessary. A system of small settling ponds followed by a 60 foot sump at the bottom of the shaft will be used to remove sediment from groundwater collected in the workings. The clarified water will then be pumped to the surface and discharged to the Boulder River at an estimated rate of 500 gpm (gallons per minute). Additional settling capability will be available at the surface if needed.

A 150 TPD (tons per day) mill equipped for gravity concentration and flotation will process the ore. Water required for mill operation will be obtained from the Basin Water Company. Since decanted water from the tailing pond will be recirculated back into the mill circuit, only make-up water will be required. No discharge of decant water to the Boulder River is anticipated.

Tailings will be impounded immediately below the mill on the north side of U.S. Highway 91. One pond has been constructed to date; however, a second may be required by spring, 1974.

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LBM Construction, Inc., Butte, Montana will operate the reopened Jib Mine. It is not known how long operations will last, but the corporation's lease agreement is renewable after 20 years.

EXISTING ENVIRONMENT

The Jib Mine and Mill are located at Basin, a community of about 300 persons. Basin is on U.S. Highway 91, 28 and 36 miles from Butte and Helena, respectively. The town's history and growth has been keyed closely to mining activity in the surrounding mountains and in particular, to the Jib Mine. Thus, as mining generally declined this century, so followed the town.

Mountains surrounding Basin are composed of granites of the Boulder batholith. This formation, with its related outliers, is Montana's most important geologic feature economically. Sixty-nine percent of the 2,000 square mile area occupied by the batholith is in Jefferson County (Roby, Ackerman, Fulkerson, Crowley, 1960).

The Boulder River Valley at Basin is narrow and bounded by mountains which are neither very high nor rugged. According to Roby, Ackerman, Fulkerson, and Crowley (1960), flat or gentle slopes which suggest erosional remnants of a pre-existing surface characterize most of the highest summits. Heavy stands of lodgepole pine, plus spruce and fir, occupy most mountain slopes.

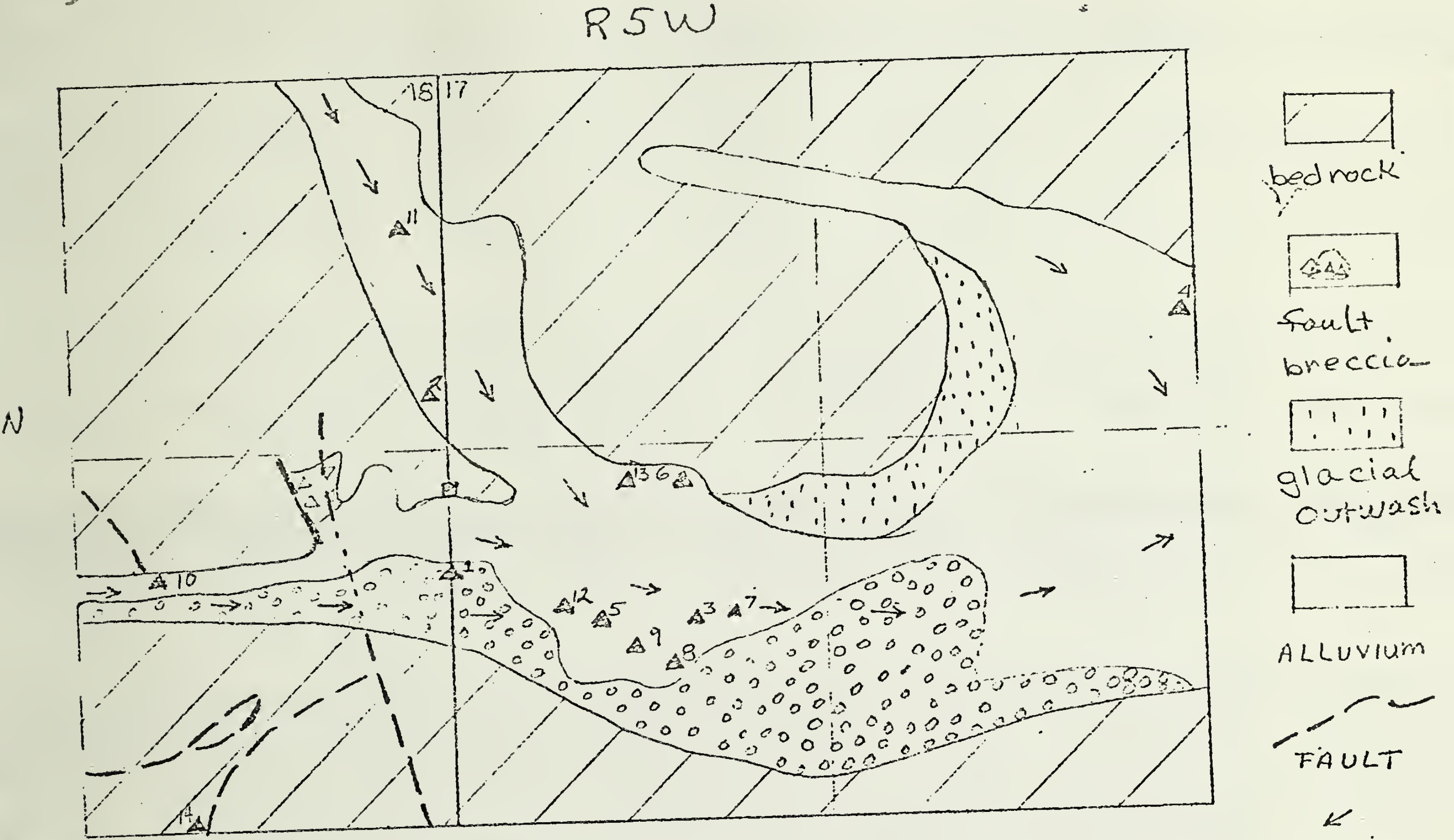
That portion of the valley floor occupied by the townsite is underlain by alluvial fill of the Boulder River. According to Halloran (1973), alluvium deposition occurred because of past changes in sea level, or at least changes in the local base of erosion which in turn caused hydraulic readjustment of the Boulder River. The depth to bedrock is estimated at 30 to 50 feet. Most wells in Basin are located in this valley fill. The Jib Mine is in bedrock on the north edge of this alluvium. Geological features and the location of private wells are shown in Figure 1. Well water measurements are given in Table 1.

Basin Creek, which joins the Boulder River at Basin, and the Boulder River both lose water to underlying gravels in this area. This water, plus the small amount contributed by precipitation, becomes the groundwater for wells in the area, plus the groundwater encountered in the Jib Mine (Halloran, 1973).

The Jib Mine and Jib Mill sites are shown in Figures 2 and 3. These are sites which were used for similar operations when the Jib was operated in the past. However, the tailing pond(s) will now be located north of U.S. Highway 91 rather than south of the highway. The new pond area slopes gently and is covered with a mixture of sagebrush and grasses. This location is well away from any watercourse and is not subject to flooding.

Water for domestic supply in Basin is obtained either from private wells (Figure 1) or from the Basin Water Company. Water supplied by the water company is derived from Basin Creek and from a 45 foot deep well drilled in the Basin Creek alluvium.

Figure 1. Hydrogeologic Map of Basin Mt. (Halloran, 1973)



well owner	water level
1. ABELIN, DENICE	RM (regularly measured)
2. GOODWIN, CHAS.	RM
3. HRISTON, P.L.	NM (not measured)
4 JOHNSON, DAVE	RM
5 Lowe, Mrs	RM
6. MADDEN, BRAD	RM
7. O'NEILL, MRS JOHN	NM
8. STAYTON, MRS	RM
9. THOMPSON, GRANT	RM
10. ULSTER, ANDREW	RM & NM (2 wells)
[illegible]. BASIN WATER Co	FlowING
12. KATKA, MARVIN	NM
13. STAUNER, NORBERT	NM
14 Coleman Perry	[illegible]

TABLE 1.

BASIN WATER WELL MEASUREMENTS

Abelin, Denice	18.7'	12' ①	13.35'	12.5'
Goodwin, Chas.	80"	96"	109"	125.5"
Johnson, Dave	NM	NM	17'8"	17'3" ✓
Lowe, Mrs	NM	3.65' ②	4.23'	4.5'
Madden, Brad	NM	NM ②	25.5'	26.5'
Stayton, Mrs.	Dry	Dry	NM	NM
Thompson, Grant	5.8'	7'	7.3'	7.6'
Ulster, Andrew	N.M	NM	23.6'	24.9' ③
Dates of Measurement	9 11 73	9 21 73	9 28 73	10 5 73

Footnotes

① well was cleaned out and perforated between first and second measurement.

② Unused wells

NM — no measurement

③ measurement made by Ulster on 10/4/73

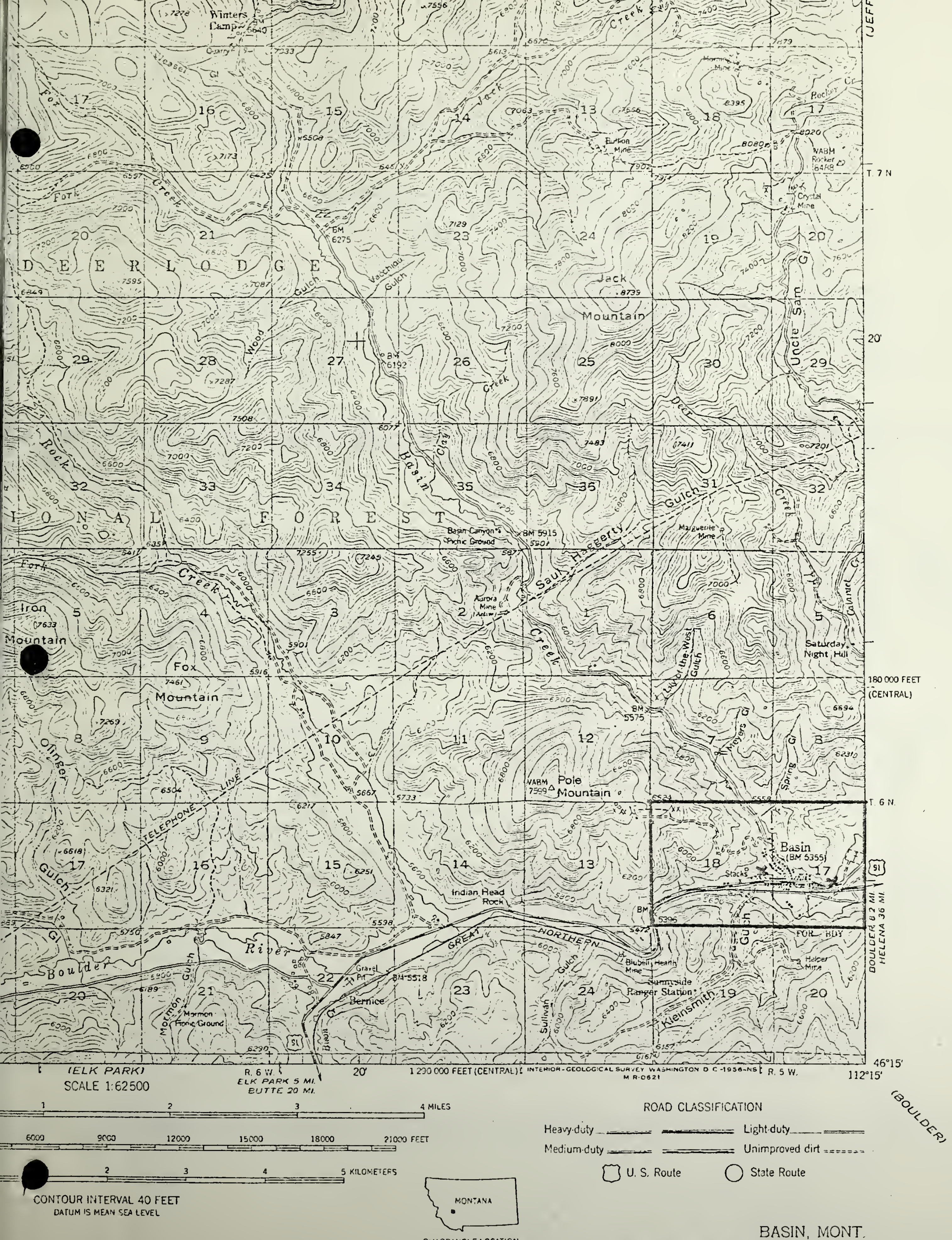


FIGURE 2. AREA MAP

MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
URVEY, FEDERAL CENTER, DENVER, COLORADO OR WASHINGTON 25, D.C.
BING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

1954

LBM Constr
1816 Lafaye
Butte, Mon

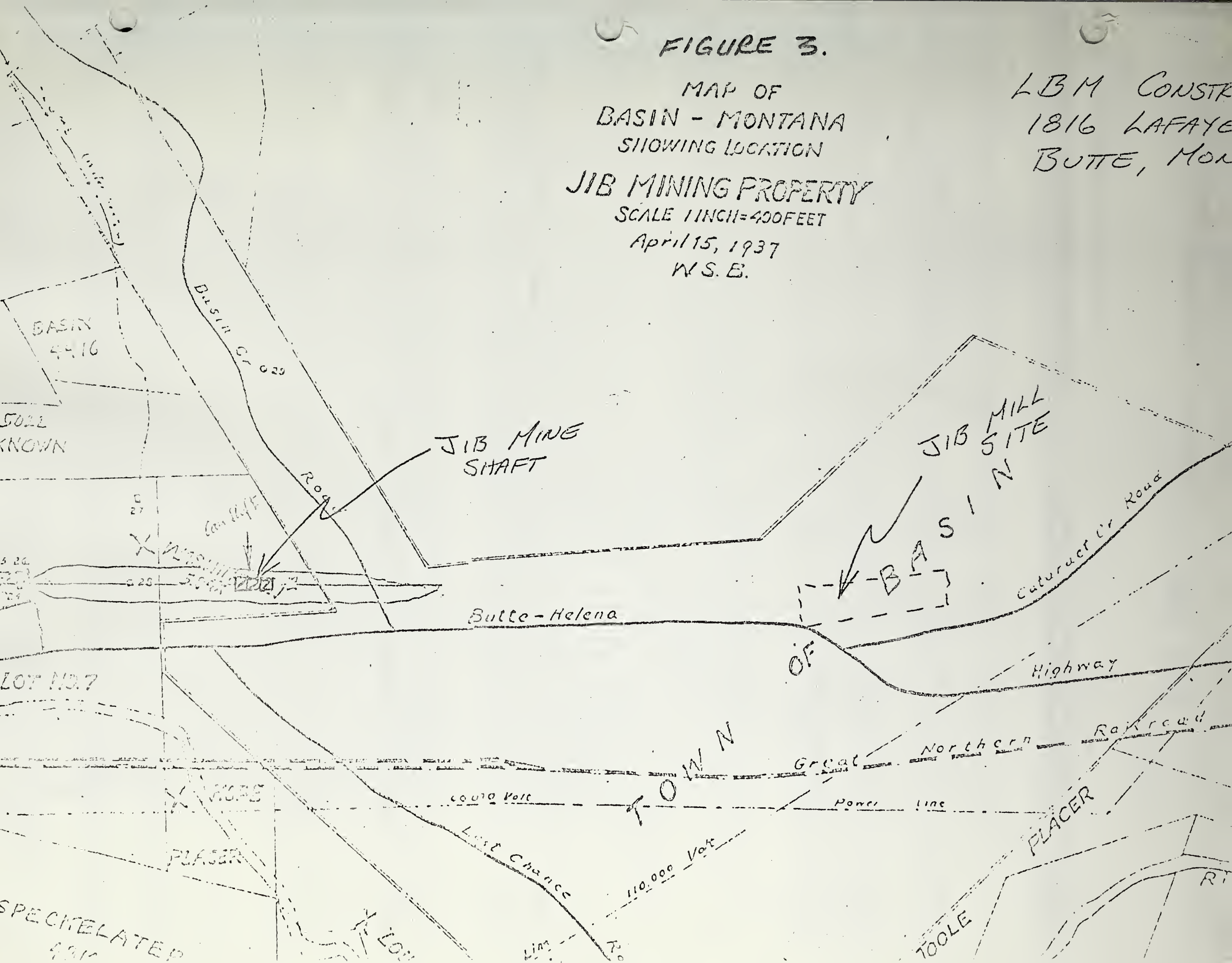


FIGURE 3.

MAP OF
BASIN - MONTANA
SHOWING LOCATION
JIB MINING PROPERTY
SCALE 1 INCH=400 FEET
April 15, 1937
W.S.B.

PROBABLE ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Impact of Site Preparation and Plant Construction

Little, if any, surface disturbance will occur at the mine site. New equipment is being installed at the existing shaft.

Land presently in sagebrush and grasses will be used for tailings disposal. One pond already has been constructed; a second may be required by spring, 1974. Since this is part of the former general mill site, little environmental loss should be realized. The site probably has little value as big game winter range because of its proximity to Basin and the highway.

Structural erection at the mine and mill, plus tailing pond construction, will cause some unavoidable noise.

Impact of Plant Operation

Some unavoidable noise will result from operation of the mine and mill; and some inconvenience may develop if local vehicular traffic movements were slowed by trucks hauling ore to the mill.

Water used at the mill will be recirculated and not discharged. Water collected in the mine workings will be discharged to the Boulder River after removal of suspended solids by settling.

The mill is designed for a capacity of 150 TPD (tons per day); however, operations will commence at 50 TPD and be gradually increased over a period of approximately three to six months. Five men will be required initially; maximum production probably will require an additional two men. A total employment of approximately 30 men is anticipated. As many men as possible will be hired from the Basin-Boulder area. At present, five of the seven men on the payroll, exclusive of the corporation officers, are local residents.

All gasoline and minor materials presently are purchased in Basin. Further economic stimulus to the community should be realized by local spending due to the payroll.

Human wastes at both the mine and mill will be disposed of by septic tanks and drainfields.

Dewatering operations at the mine may have caused a lowering of the local groundwater table. This, in turn, apparently has caused three of the wells to go dry and a general lowering of the water levels in some other wells (Halloran, 1973). The drying of wells in Basin was common during past operating periods of the Jib (LBM, 1973). Because of its location, the recently drilled Basin Water Company well should not be affected by mining operations.

PROGRAM PROVISIONS TO MITIGATE ADVERSE ENVIRONMENTAL EFFECTS

Operation of the mine and mill will require an operating permit from the Montana Department of State Lands. Protection of air, land and water resources will be a condition of this permit.

The source of water for Basin, other than private wells, is Basin Creek and a recently drilled well. The system using the creek was built in 1904 by the company then operating the Jib Mine. According to LBM Construction, Inc. (1973), the system was installed because mine dewatering caused several wells in Basin to go dry. LBM Construction Inc. (1973) has offered to connect homes with failing wells to the Basin water system. The system, however, is in poor condition requiring much maintenance. In addition, sanitary quality of the water is unsatisfactory. On February 1, 1973, the Director of the State Department of Health and Environmental Sciences directed the Basin Water Association to notify all water users of the unsatisfactory sanitary quality of the water. He also requested the association to direct all water users to boil or otherwise disinfect all water for drinking or other domestic purposes (Clarkson, 1973). This order had not been rescinded as of November 5, 1973.

Topsoil has been placed on slopes of the existing tailing pond to promote establishment of vegetative cover. Topsoil will be placed similarly on other ponds which are constructed. This action should control slope erosion.

A permit will be required for water pumped from the mine workings and discharged to the Boulder River. This permit will be conditioned so applicable State water quality standards are met.

A partial analysis of water from the mine is given in Table 2. Results indicate the water probably is not harmful to fish and associated aquatic life if particulate material is removed. Suspended solids will be controlled by settling facilities within the mine and, if necessary, at the surface.

TABLE 2. ANALYSIS OF JIB MINE DISCHARGE WATER (1), PLUS RECOMMENDED LIMITS FOR HEAVY METAL CONCENTRATIONS FOR FISH AND AQUATIC LIFE

PARAMETER(2)	JIB MINE WATER CONCENTRATION		RECOMMENDED LIMITS	
	dissolved	suspended sediment	McKee and Wolf (1971)	FWPCA 1968
Copper	0.01	0.05	0.02	1/10 96-hr. TLm at any time or 1/30 96-hr. TLm 24-hr. average
Zinc	0.04	0.06	(3)	1/100 96-hr TLm (Brungs)
Iron	0.01	1.1	0.3 - 0.7 (Ellis)	None
Manganese	0.52	0.57	1.0	-
Arsenic	-	0.01	1.0	-
Turbidity	80 JTU		-	10 JTU

(1) Sample collected on September 5, 1973.

(2) All parameter concentrations except turbidity are in mg/1 (milligrams per liter). Turbidity is expressed in JTU (Jackson Turbidity Units).

(3) Afflect (1952) reported a zinc concentration of 0.04 mg/1 in soft water prevented hatching of rainbow trout eggs.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Operation of the mine and mill is expected to last at least 20 years. The present relationship between local and short-term use of the area and maintenance and enhancement of long-term productivity should remain unchanged.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Jib Mine and Mill should pose a minimal commitment of resources. Approximately 150 TPD of ore will be irretrievably removed from the mine. An undetermined, but small amount of make-up water will be required for the milling operation.

ALTERNATIVES TO THE PROPOSED ACTION

The only other alternative would be to cease operations.

AGENCIES CONSULTED ABOUT THE PROJECT

Initially, only the Department of State Lands was consulted. This was by virtue of filing a Small Miners Permit. Since that time contact has been made with other agencies and officials which are listed below:

1. Montana Department of Health and Environmental Sciences,
2. Montana Department of Natural Resources,
3. Montana Department of Fish and Game,
4. and various Jefferson County officials.

The Jib Mine and Mill are being developed without the control of local planning, zoning or other local officials except those listed above.

REFERENCES

Clarkson, Arthur W. Montana Department of Health and Environmental Sciences letter to Mrs. Aldie M. Goodwin, November 5, 1973.

Halloran, James E. Private communication, October 10, 1973.

LBM Construction, Inc. Letter to Montana Department of Health and Environmental Sciences, October 25, 1973.

McKee, Jack Edward and Harold W. Wolf. Water Quality Criteria. Sacramento, California, California State Water Resources Control Board, Second Edition, 1971.

Montana Department of Health and Environmental Sciences. Water Supply Inspection for Basin, Montana, June 18, 1973.

Roby, R.N., W. C. Ackerman, F. B. Fulkerson, and F. A. Crowley. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana. Butte, Montana: Montana Bureau of Mines and Geology, Bulletin 16, June, 1960.

Water Quality Criteria. Washington, D.C.: FWPCA, April 1, 1968.